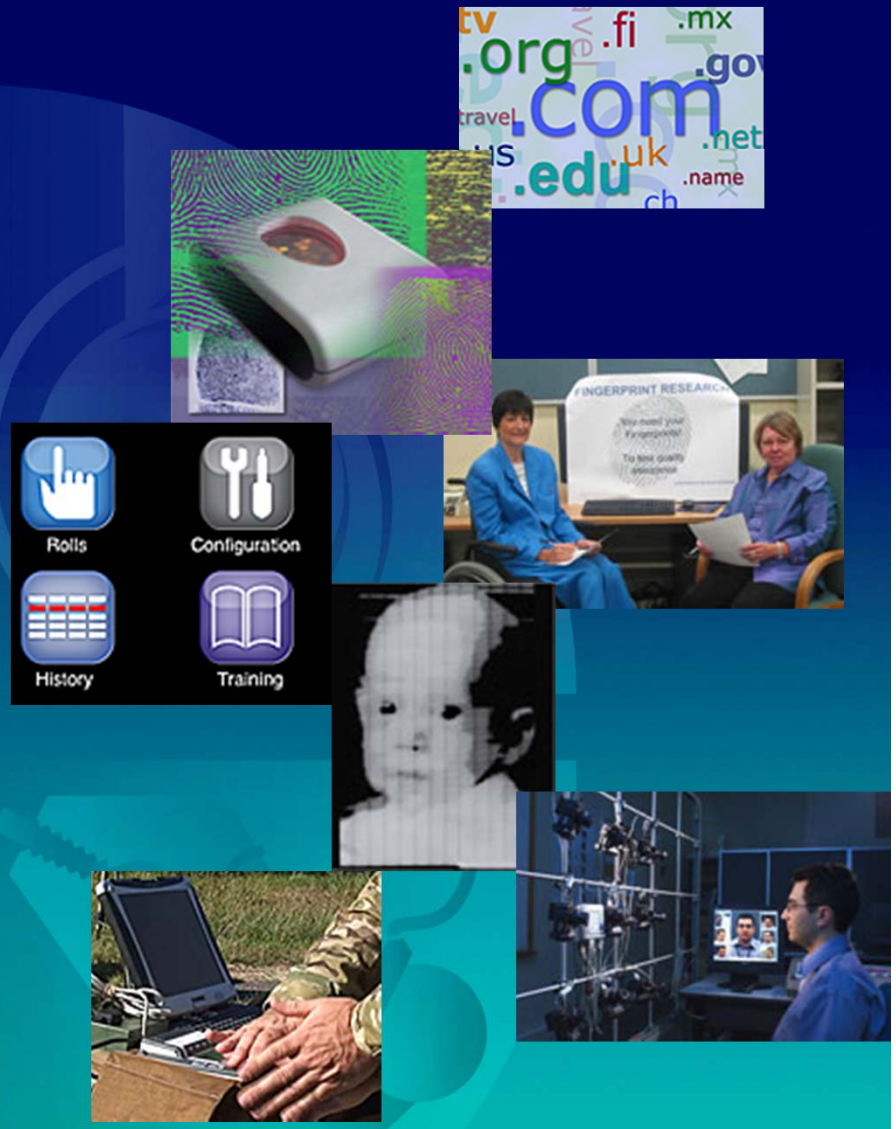
NIST Cloud Computing Standards Roadmap Working Group (CCSRWG)



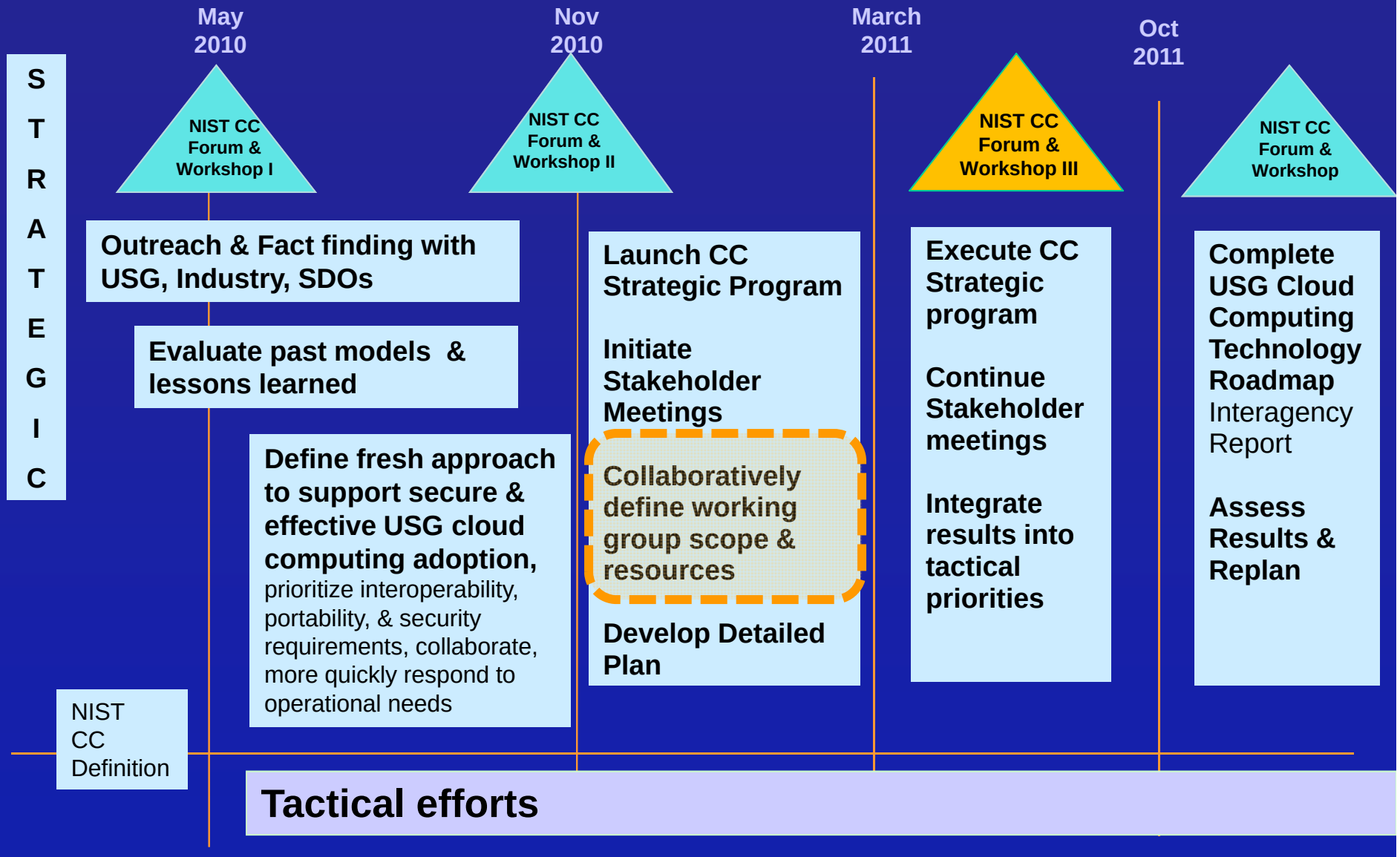
NIST Cloud Computing Forum and Workshop III

April 8, 2011

National Institute of Standards and Technology

U.S. Department of Commerce

NIST Cloud Computing Program Timeline



USG Cloud Computing Technology Roadmap

The roadmap will define and prioritize USG requirements for interoperability, portability, and security for cloud computing in order to support secure and effective USG adoption of Cloud Computing.

NIST has created the following Working Groups:

- **Cloud Computing Target Business Use Cases Working Group**
- **Cloud Computing Reference Architecture Working Group**
- **Cloud Computing Standards Roadmap Working Group**
- **Cloud Computing Security Working Group**
- **Cloud Computing SAJACC Technical Use Cases Working Group**

Cloud Computing
Standards Roadmap
Working Group
CCSRWG

MISSION STATEMENT

NIST Cloud Computing Standards Roadmap Working Group will survey the existing standards landscape for security, portability, and interoperability standards / models / studies / etc. relevant to cloud computing, determine standards gaps, and identify standardization priorities.

Charter

Charter – December 27, 2010

Conveners – Mike Hogan and Annie Sokol

Participation – WG is open to all interested parties

Liaisons – The work of the NIST CC WGs is interrelated and CCSRWG will liaise with the other WGs as needed.

Deliverable – A recommended Cloud Computing Standards Roadmap document

Target Date in Charter – March 31, 2011

Deliverable

The NIST Cloud Computing Standards Roadmap document will serve as an input to the **USG Cloud Computing Technology Roadmap**.

Target Date in Charter – March 31, 2011

Present Target Date – April 30, 2011

Participants & Meetings

- **Email sign-up**
  - January 18, 2011: 346
  - February 15, 2011: 462
  - April 2011: 537 (>250 known organizations – national and globally)

- **Meetings**
  - First meeting was January 6, 2011
  - Every Thursday afternoon at 1:00 P.M. ET
  - Bi-weekly meetings since March 10, 2011 (except April 7)
  - Total of 11 meetings
  - The number of participants range between 20+ - 40+
  - F2F Meeting – January 20, 2011, following DAPS38 meeting
  - Use Case Integration Ad hoc group – met for three weeks

Standards Roadmap document

Cloud Computing Standards Roadmap Working Group

CCSRWG

Standards Roadmap Document

1. January 26 – Doc.#21
2. February 2 – Doc.#29
3. February 9 – Doc. #36
4. February 17 – Doc.#40
5. February 23 – Doc.#42
6. March 2 – Doc.#48
7. March 9 – Doc.#52
8. March 23 – Doc.#56
9. **March 28 – Doc.#60**

Comments due April 11, 2011

Cloud Computing Standards Roadmap Working Group (CCSRWG)

This rest of this presentation is based upon the

Ninth Working Draft

+

NIST draft comments on the Ninth Working Draft

Deliverable - Standards Roadmap Document

Cloud Computing Standards Roadmap Working Group

CCSRWG

Concept of Operation

1. Apply NIST Cloud Computing definition
2. Leverage the work of NIST Working Groups
3. Build an inventory of standards
4. Map standards to use cases and RA model
5. Determine standards gaps and overlaps
6. Identify USG standardization priorities
7. Recommendations

NIST Definition of Cloud Computing

"Cloud computing is a model for enabling convenient, on-demand network access to a shared pool of configurable computing resources (e.g., networks, servers, storage, applications, and services) that can be rapidly provisioned and released with minimal management effort or service provider interaction."

Step 2

NIST CCSRWG Collaboration Site

http://collaborate.nist.gov/twiki-cloud-computing/bin/view/CloudComputing/StandardsRoadmap

Leverage the work of NIST Working Groups AND Other work

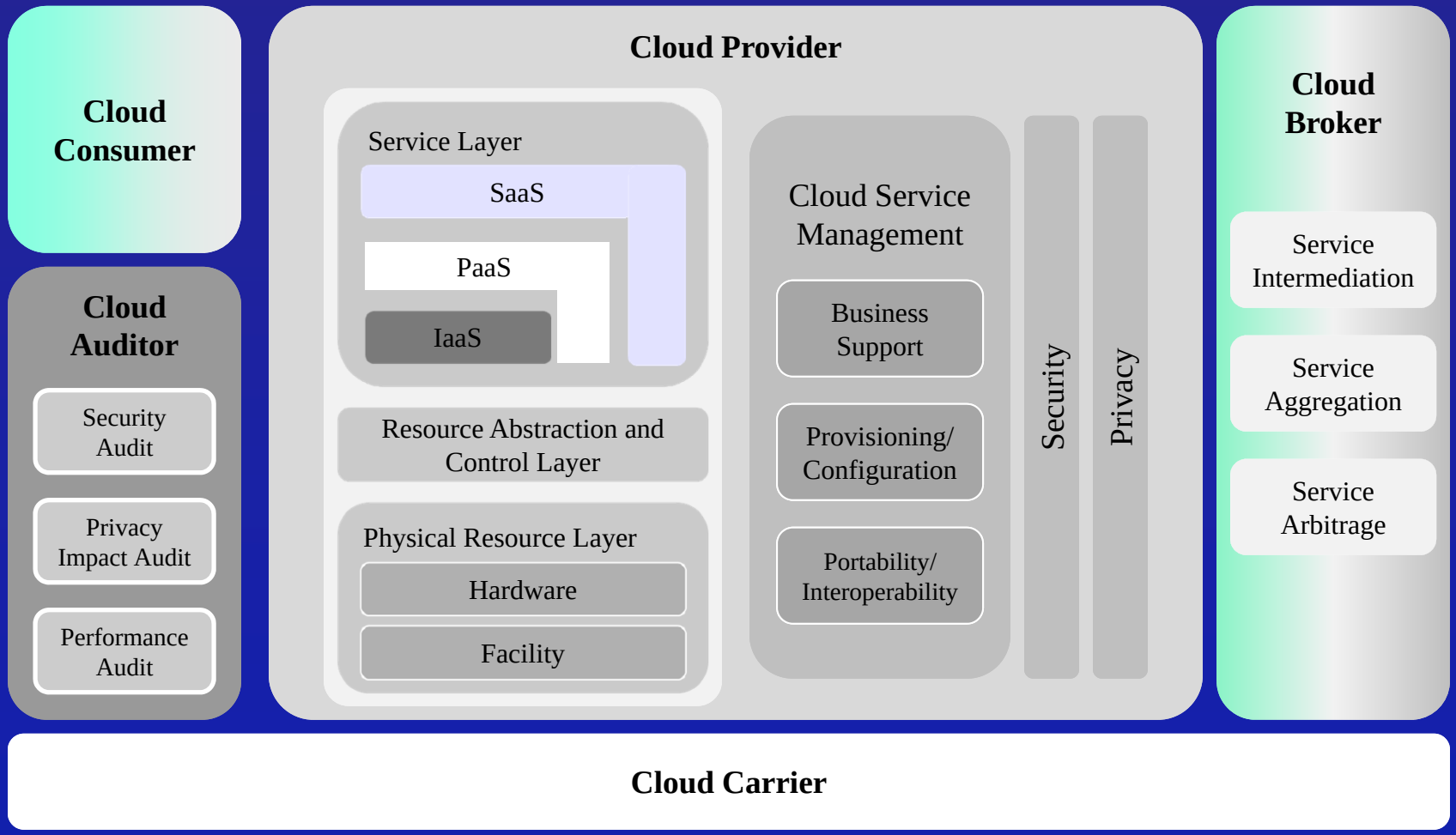
Cloud Computing Standards Roadmap Working Group

NIST Cloud Computing Working Groups

SDOs & Others
Standards,
Conceptual Models,
Reference Architectures,
Standards Roadmaps,
Studies

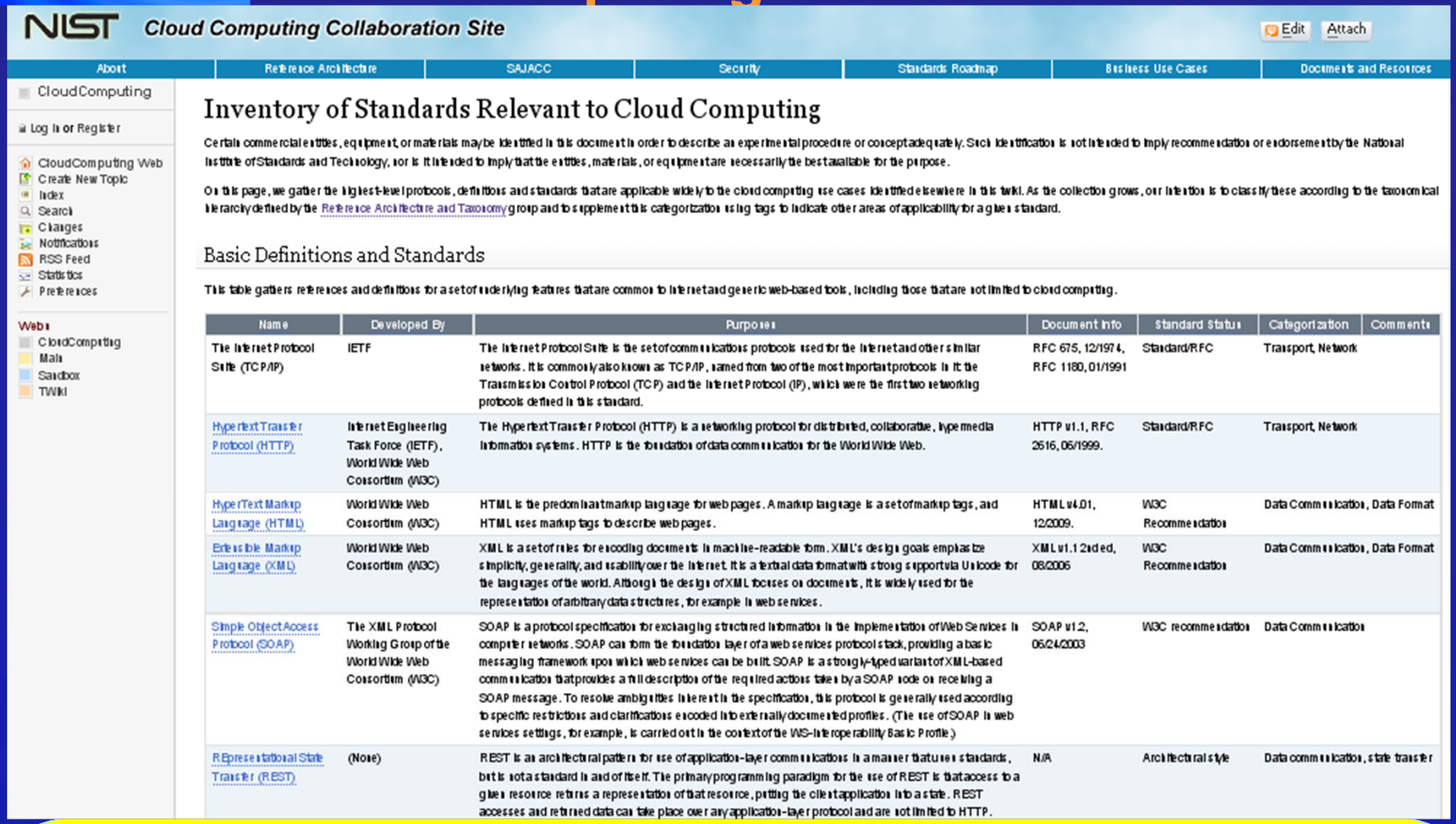
Step 2

NIST Cloud Computing Reference Architecture V1.0



Step 3

Inventory of Standards Relevant to Cloud Computing



NIST Cloud Computing Collaboration Site

Edit Attach

About | Reference Architecture | SAJACC | Security | Standards Roadmap | Business Use Cases | Documents and Resources

CloudComputing

Log In or Register

CloudComputing Web
Create New Topic
Index
Search
Changes
Notifications
RSS Feed
Statistics
Preferences

Webs
CloudComputing
Main
Sandbox
TWiki

Inventory of Standards Relevant to Cloud Computing

Certain commercial entities, equipment, or materials may be identified in this document in order to describe an experimental procedure or concept adequately. Such identification is not intended to imply recommendation or endorsement by the National Institute of Standards and Technology, nor is it intended to imply that the entities, materials, or equipment are necessarily the best available for the purpose.

On this page, we gather the highest-level protocols, definitions and standards that are applicable widely to the cloud computing use cases identified elsewhere in this twiki. As the collection grows, our intention is to classify these according to the taxonomical hierarchy defined by the Reference Architecture and Taxonomy group and to supplement this categorization using tags to indicate other areas of applicability for a given standard.

Basic Definitions and Standards

This table gathers references and definitions for a set of underlying features that are common to internet and generic web-based tools, including those that are not limited to cloud computing.

Name	Developed By	Purpose	Document Info	Standard Status	Categorization	Comments
The Internet Protocol Suite (TCP/IP)	IETF	The Internet Protocol Suite is the set of communications protocols used for the Internet and other similar networks. It is commonly also known as TCP/IP, named from two of the most important protocols in it: the Transmission Control Protocol (TCP) and the Internet Protocol (IP), which were the first two networking protocols defined in this standard.	RFC 675, 12/1974, RFC 1180, 01/1991	Standard/RFC	Transport, Network	
HyperText Transfer Protocol (HTTP)	Internet Engineering Task Force (IETF), World Wide Web Consortium (W3C)	The HyperText Transfer Protocol (HTTP) is a networking protocol for distributed, collaborative, hypermedia information systems. HTTP is the foundation of data communication for the World Wide Web.	HTTP v1.1, RFC 2616, 06/1999.	Standard/RFC	Transport, Network	
HyperText Markup Language (HTML)	World Wide Web Consortium (W3C)	HTML is the predominant markup language for web pages. A markup language is a set of markup tags, and HTML uses markup tags to describe web pages.	HTML v4.01, 12/2009.	W3C Recommendation	Data Communication, Data Format	
Extensible Markup Language (XML)	World Wide Web Consortium (W3C)	XML is a set of rules for encoding documents in machine-readable form. XML's design goals emphasize simplicity, generality, and usability over the Internet. It is a textual data format with strong support via Unicode for the languages of the world. Although the design of XML focuses on documents, it is widely used for the representation of arbitrary data structures, for example in web services.	XML v1.1 2nd ed, 08/2006	W3C Recommendation	Data Communication, Data Format	
Simple Object Access Protocol (SOAP)	The XML Protocol Working Group of the World Wide Web Consortium (W3C)	SOAP is a protocol specification for exchanging structured information in the implementation of Web Services in computer networks. SOAP can form the foundation layer of a web services protocol stack, providing a basic messaging framework upon which web services can be built. SOAP is a strongly-typed variant of XML-based communication that provides a full description of the required actions taken by a SOAP node on receiving a SOAP message. To resolve ambiguities inherent in the specification, this protocol is generally used according to specific restrictions and clarifications encoded into externally documented profiles. (The use of SOAP in web services settings, for example, is carried out in the context of the WS-Interoperability Basic Profile.)	SOAP v1.2, 06/24/2003	W3C recommendation	Data Communication	
REpresentational State Transfer (REST)	(None)	REST is an architectural pattern for use of application-layer communications in a manner that uses standards, but is not a standard in and of itself. The primary programming paradigm for the use of REST is that access to a given resource returns a representation of that resource, putting the client application into a state. REST accesses and returned data can take place over any application-layer protocol and are not limited to HTTP.	N/A	Architectural style	Data communication, state transfer	

http://collaborate.nist.gov/twiki-cloud-computing/bin/view/CloudComputing/StandardsInventory

Inventory of Standards Relevant to Cloud Computing

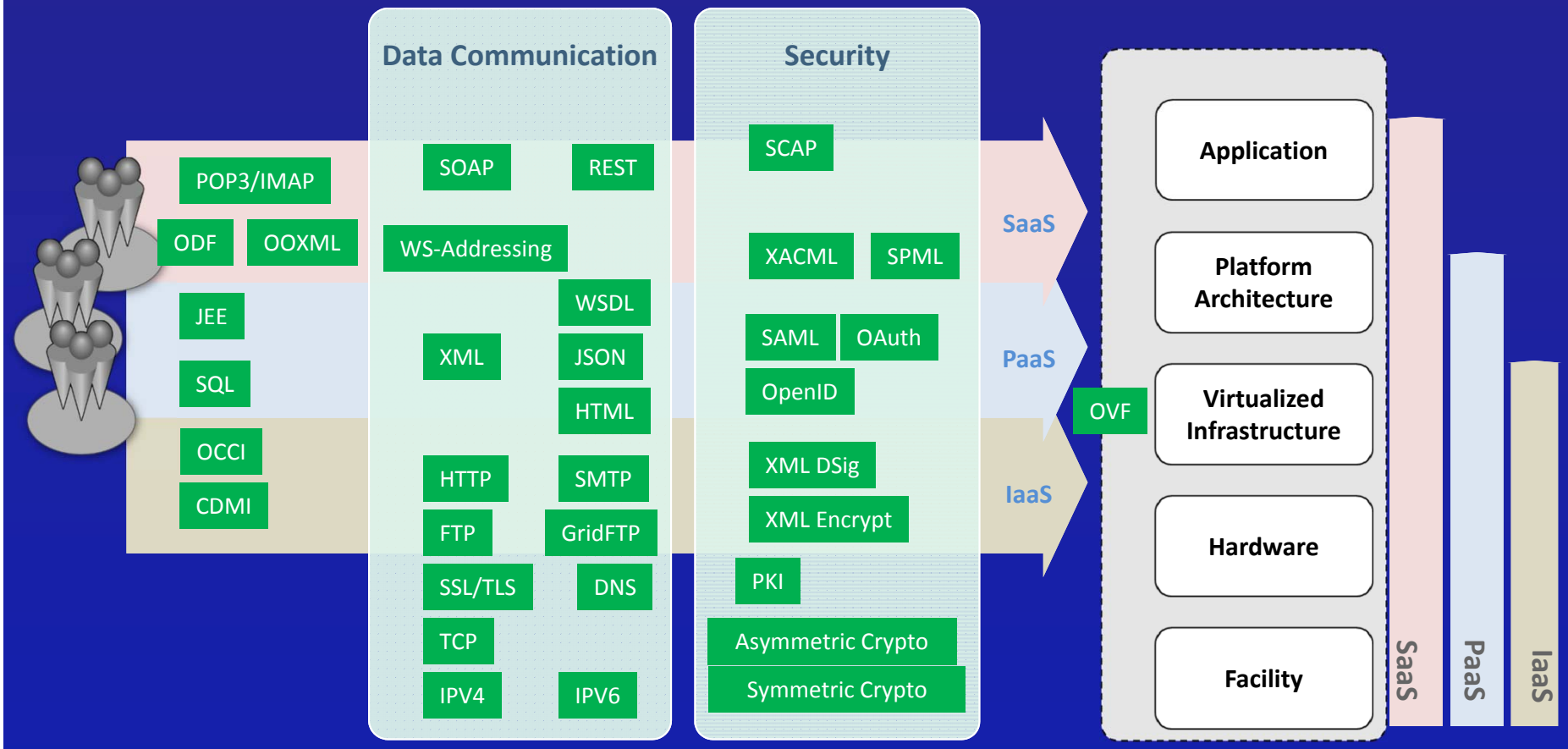
Basic Definitions & Standards	High Level Standards & Definition for Cloud and Web Services	Categorization of Cloud Computing Related Standards	Work-in-Progress
TCP/IP, HTTP, HTML, XML, SOAP, REST, WSDL, SSL/TLS, XML/XMLD, JSON, TRP, DNS, SMTP…	OVF, OCCI, CDMI, SPML, Web services, GridFTP, OAuth, OpenID, WS, WSS, SAML, Frameworx, XACML,….	Cloud Taxonomy – output from Reference Architecture Working Group…	White papers…

Observations on Inventory

- There are not many *specific* Cloud Computing Standards
  - Open Virtualization Format (OVF)
  - Open Cloud Computing Interface (OCCI)
  - Cloud Data Management Interface (CDMI)
- There are many cloud *relevant* IT standards to leverage

Step 3

Visualization of the Inventory



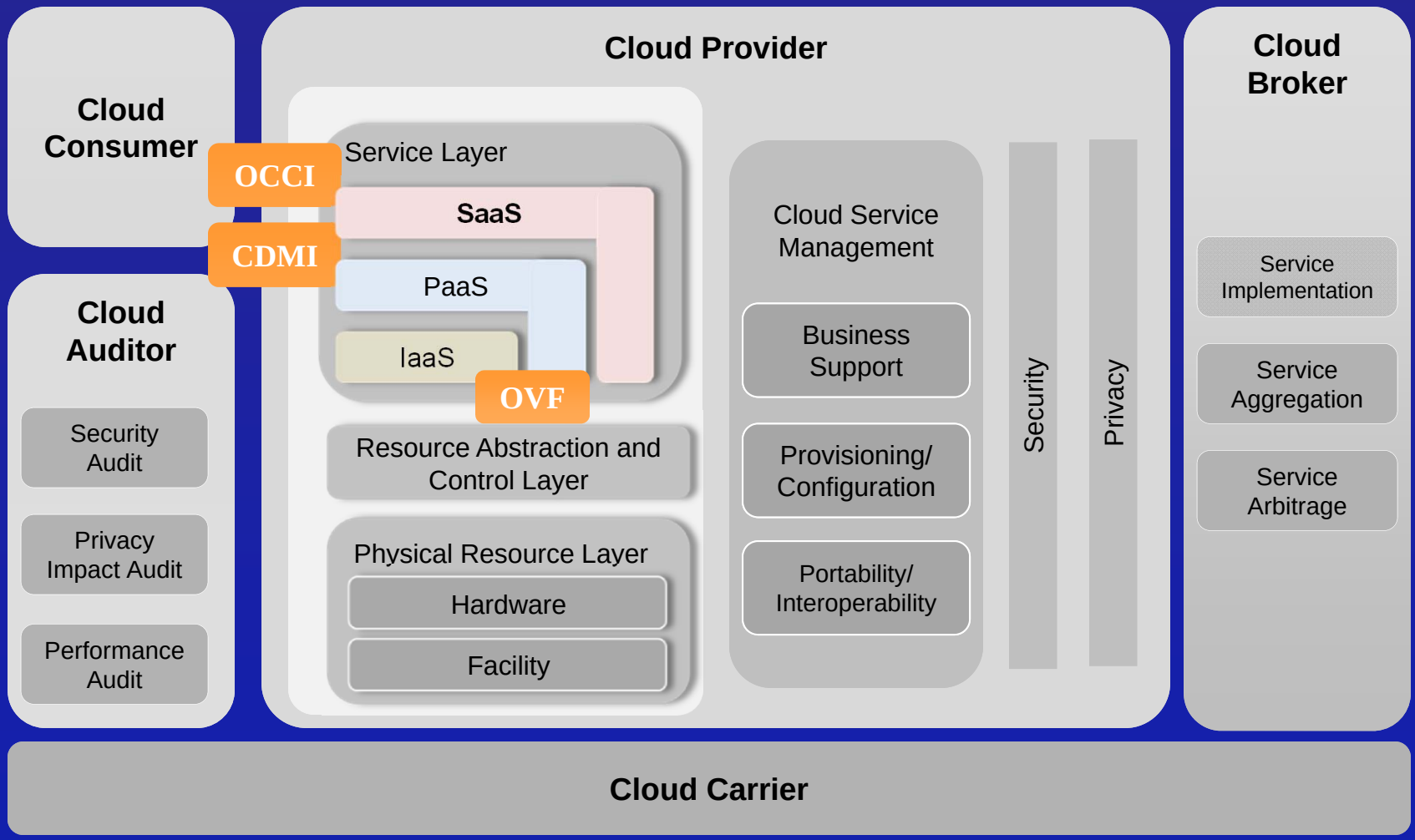
Consumer Interface and Visibility

Cloud Computing Capabilities and Resources

Provider Control and Responsibility

Step 4

Existing Cloud Computing Specific Standards



Cloud Computing Standards Gap Analysis – NIST Contribution

Cloud Consumer

Cloud Auditor

- Security Audit
- Privacy Impact Audit
- Performance Audit

Cloud Provider

Service Layer
- SaaS
- PaaS
- IaaS

Resource Abstraction and Control Layer

Physical Resource Layer
- Hardware
- Facility

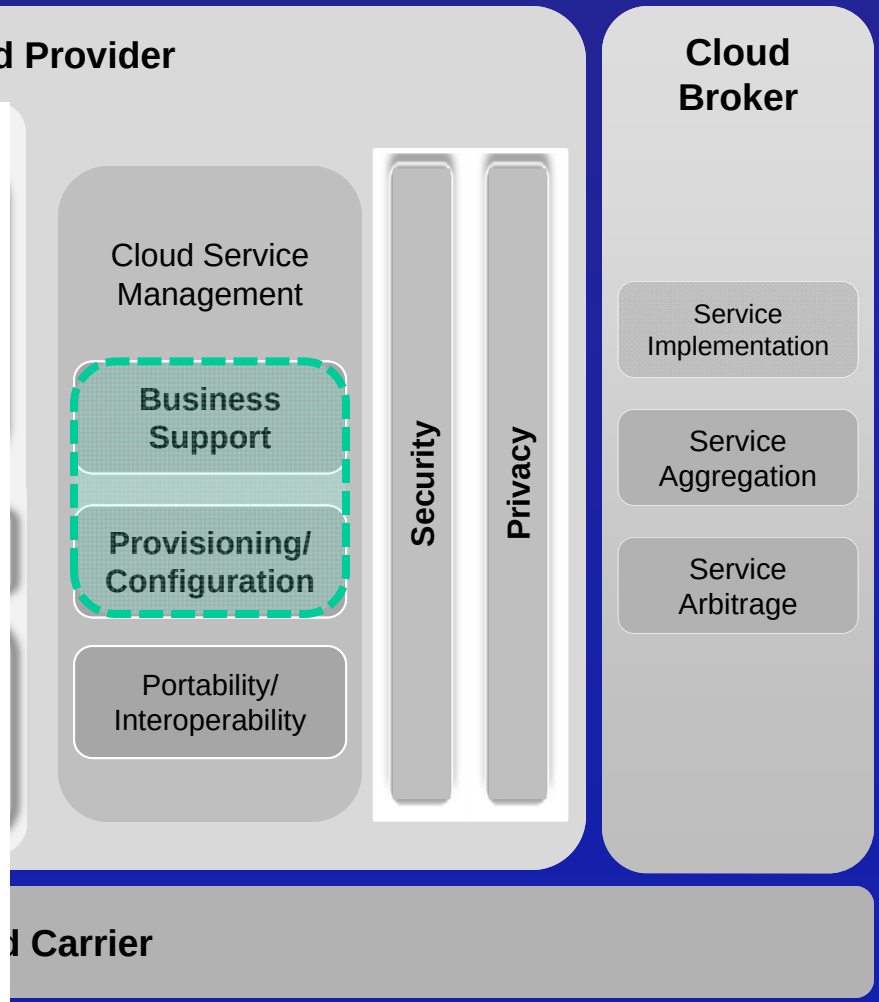
Cloud Broker

- **SaaS Self-service management**
- **Application specific data formats**
- **Application functional interfaces**

Cloud Carrier

Cloud Computing Standards Gap Analysis – NIST Contribution

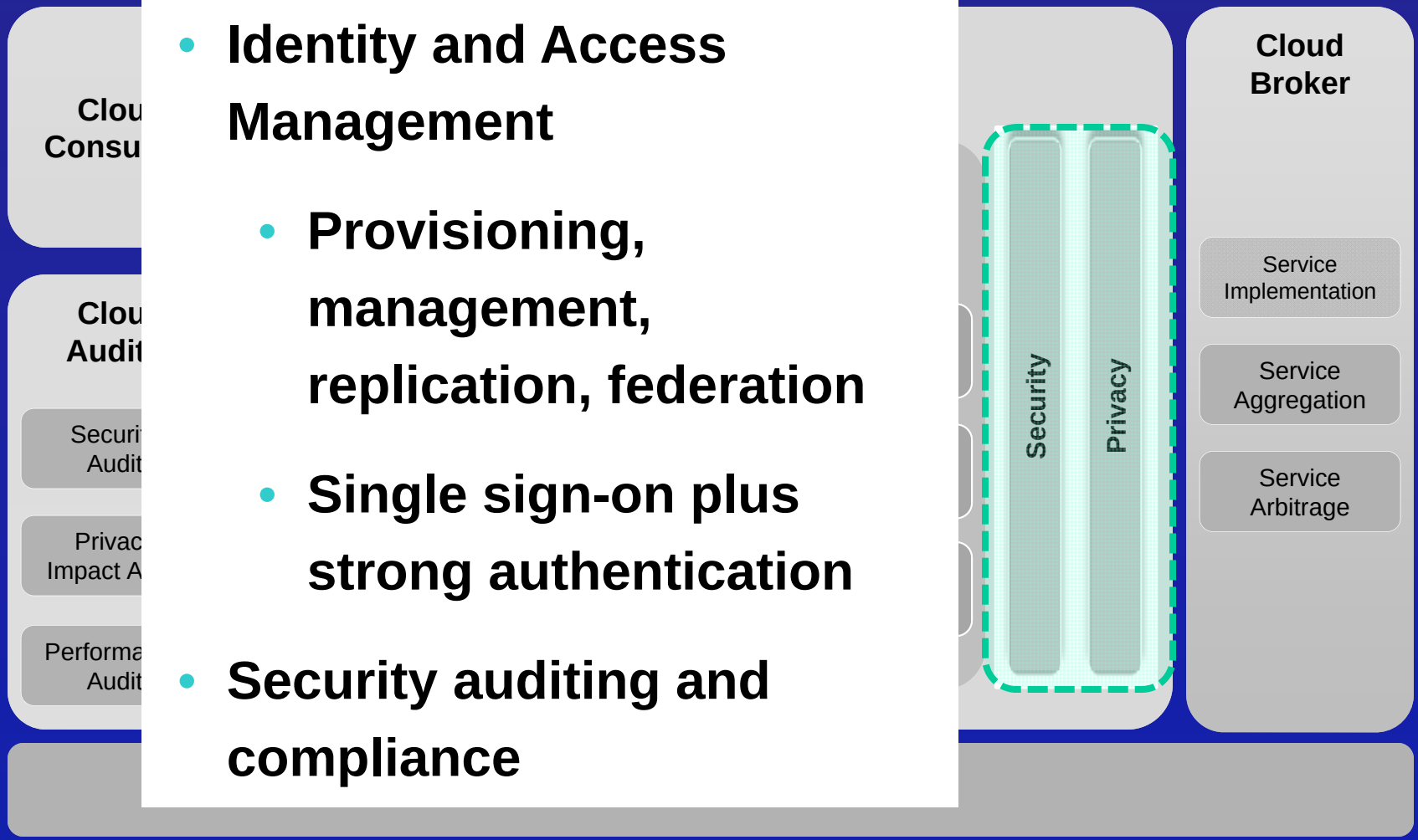
- **Resource description and discovery**
- **QoS specification, monitoring, reporting**
- **SLA specification and negotiation**
- **Billing and metering**



Step 5

Cloud Computing Standards Gap Analysis – NIST Contribution

- **Identity and Access Management**
  - **Provisioning, management, replication, federation**
  - **Single sign-on plus strong authentication**
- **Security auditing and compliance**



USG Priorities – NIST Contribution

From Analysis of USG Use Cases

- SaaS Self-service management
- **Application specific data formats**
- Application functional interfaces

- **Resource description and discovery**
- QoS specification, monitoring, reporting
- SLA specification and negotiation
- Billing and metering

- **Identity and Access Management**
  - Provisioning, management, replication, federation
  - Single sign-on plus strong authentication
- **Security auditing and compliance**

Draft Recommendations

Agencies

- Contribute clear and comprehensive requirements for cloud computing standards projects.
- Participate actively in standards development projects.
- Support the concurrent development of conformity and interoperability assessment schemes.
- Specify cloud computing standards in their procurement and grant guidance.

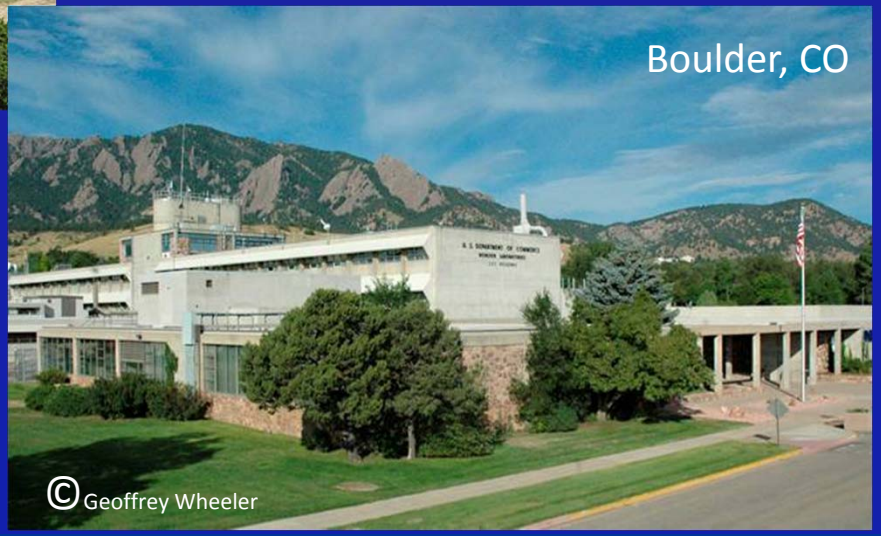
Draft Recommendations

- Recommend specific cloud computing standards and best practices for USG-wide use.

CIO Council Cloud Computing Standards Working Group

QUESTIONS ?


Gaithersburg, MD
Courtesy HDR Architecture, Inc./Steve Hall © Hedrich Blessing


Boulder, CO
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BREAK – 15 MINUTES

10:30 – 10:45